ETHER NDE

SIGMACHECK

HANDHELD EDDY CURRENT CONDUCTIVITY METER

USER MANUAL

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1 Introduction

1.1 About the SIGMACHECK

The SIGMACHECK is designed to be extremely easy to use making it suitable for use by shop floor inspectors to engineers.
The SIGMACHECK meets the requirements for conductivity measurements in the aircraft manufacturing and maintenance fields where conductivity measurements are used to verify proper alloy/temper or detect heat damaged components. The SIGMACHECK is also useful to determine the purity of precious metals (counterfeit detection) such as gold bullion and coins.
The SIGMACHECK has a large, colour, LCD display that is easily seen in all lighting conditions
The SIGMACHECK is designed for convenient single handed operation due to its sculpted housing and its convenient size and weight; only ¾ of a pound (350g.) and measuring less than 6 ½" tall x 3 ¼" wide x 1" thick (163x80x25mm). A removable, silicone rubber boot is included to protect the instrument in rough environments.
The standard Probe has been designed to comfortably fit the hand of the user.
The SIGMACHECK has a standard operating frequency of 60 kHz and auxiliary frequencies of: 120, 240, 480 and 960kHz can be selected when necessary for testing thin materials with the standard probe.
Other features of the *ETHER NDE* SIGMACHECK include:

- Field Exchangeable Probes via SD Card
- True USB PC Connectivity for remote control and data logging.
- The USB Connection allows easy charging of the Instrument without having to swap the batteries.

The SIGMACHECK is supplied with a flame retardant ABS case, a dual (Hi-Low) calibration block, probe cable, charger, USB lead, removable desk stand and user manual. Optional, small diameter probe will be offered.

1.2 Abbreviations

C	Centigrade
F	Fahrenheit
IACS	International Annealed Copper Standard
MicroSD	Micro Secure Digital Flash Memory Card
Mil	Thousandths of an inch (0.001") US
MS/m	Mega Siemens per metre
Thou	Thousandths of an inch (0.001") UK

1.3 Keys

The SIGMACHECK instrument has 7 keys. 4 arrow keys (Up, Down, Left, Right), an OK key (shown with a tick), a Back or Cancel key (shown with a curly arrow) and a Power key.

1.4 Connectors

There are 2 Connectors on the SIGMACHECK
A Mini-B USB connector is on the left. This is used for:

a) Charging the instrument if rechargeable batteries are installed.
b) Powering the Instrument.
c) Connecting the instrument to a PC for data up or download.

A 5 pin Lemo connector is on the right had side for connecting probes

2 Standard Package and accessories

2.1 Standard Package

All of the following Accessories should be available before using the SIGMACHECK instrument, although limited operation can be performed without.
Not pictured is a mains connector to which the USB cable can be connected to if not connected to a PC for charging and/or operation.

Quantity	Part No	Description
1	ISIG001	SIGMACHECK Instrument
1	ASIG001	Dual conductivity standard with Cu and Stainless Steel
1	ASIG002	Adjustable instrument stand
1	40222	Silicone Rubber Boot
1	ALL05-L05-015-SIG	Probe Cable
1	PSIG001	Probe 13mm dia. 60-480 kHz
1	40289_01	Hand Rest for 13mm probe Long
1	40290_01	Hand Rest for 13mm probe Short
1	A090	USB Cable for PC connection/Charging
1	A092	Universal USB Charger AC 100-240 VAC
1	A089	MicroSD Card
1	40293	Quick Reference Guide
1	ASIG005	Manual and Utility on USB stick
1	A039	Soft Carrying Case

2.2 Recommended Accessories

Part No	Description
ASIG004	Peli Hard Case with custom insert.
ALL05-ALL05-015-SI	Probe Cable
PSIG001	Probe 13mm dia. 60-480 kHz

2.3 Optional Accessories

Part No	Description
PSIG002	7mm Probe 240-960 kHz
PSIG001R	Right Angle 13mm probe 60-480 kHz
PSIG002R	Right Angle 7mm probe 240-960 kHz
ASIG004	Peli Hard Case with custom insert.
ATBC-COPPER	Accessory, Test Block, Conductivity, Copper, (100.0-103.6 %IACS)
ATBC-ALU1200	Accessory, Test Block, Conductivity, Aluminium Alloy, 1200-H4, (58.5-60.0 %IACS)
ATBC-ALU6082	Accessory, Test Block, Conductivity, Aluminium Alloy, 6082-T6 (44.0-48.0 %IACS)
ATBC-ALU6061	Accessory, Test Block, Conductivity, Aluminium Alloy, 6061-T4 (42.3-43.8 %IACS)
ATBC-ALU2014A-T6	Accessory, Test Block, Conductivity, Aluminium Alloy, 2014A-T6 (38.0-42.0 %IACS)
ATBC-ALU2014A-T4	Accessory, Test Block, Conductivity, Aluminium Alloy, 2014A-T4 (34.0-37.0 %IACS)
ATBC-ALU7075	Accessory, Test Block, Conductivity, Aluminium Alloy, 7075-T6 (31.4-34.8 %IACS)
ATBC-ALU5083	Accessory, Test Block, Conductivity, Aluminium Alloy, 5083 (27.5-28.5 %IACS)
ATBC-BRASS	Accessory, Test Block, Conductivity, Brass, CZ 121 (24.0-26.0 %IACS)
ATBC-PBRONZE	Accessory, Test Block, Conductivity, Phosphor Bronze (17.0-22.0 %IACS)
ATBC-NICSILVER	Accessory, Test Block, Conductivity, Nickel Silver, LC1291 (8.5-9.5 %IACS)
ATBC-STST303S	Accessory, Test Block, Conductivity, Stainless Steel, 303 S (2.0-3.0 %IACS)
ATBC-TITANIUM	Accessory, Test Block, Conductivity, Titanium, 6AL-4V (1.0-2.2 %IACS)
ASIG 003	5 Test block holder.
A039	Soft Carrying Case

3 Operation of the instrument

3.1 Appearance

3.2 Operation principle

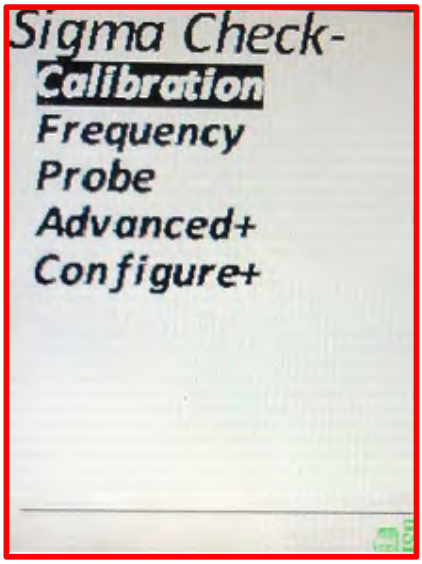
The SIGMACHECK is a simple to use Conductivity Meter with Lift-Off capability.
The SIGMACHECK contains many modern features, for example a MicroSD card is included in the instrument so that large amounts of data can be stored. A USB connector is present so that the instrument can communicate in real-time with the PC software.
Once configured, the SIGMACHECK can very quickly be picked up, turned on, calibrated and then accurate and fast measurements can be taken of Conductivity or Lift-Off.

3.3 Screen layout

The instrument has 2 main screen layouts, the menu screen and the readings screen. The Menu screen allows all aspects of the instrument to be configured, from the inspection details to the individual users' preference. The Readings screen has 2 panes, a top and a bottom.

3.4 Menu Screen / Structure

The menu system on the SIGMACHECK is designed along the lines of the folder/file layout present on many modern computers. If a menu item contains child menu items beneath it, it will have a plus ('+') symbol after it, meaning that it can be expanded to reveal more menu items. If a menu item has a minus ('-') after its title then its child menu items are already visible. This screen shot shows the Top level SIGMACHECK menu with its 4 sub menus. Advanced and Configure contain more sub menus, hence their '+'.
The Up and Down keys more up and down child menu items are the current level. To move up a level the Left or Back keys should be used. To enter a menu items sub items, the Right or OK keys are used.

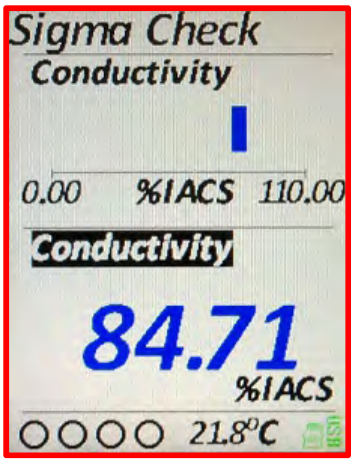


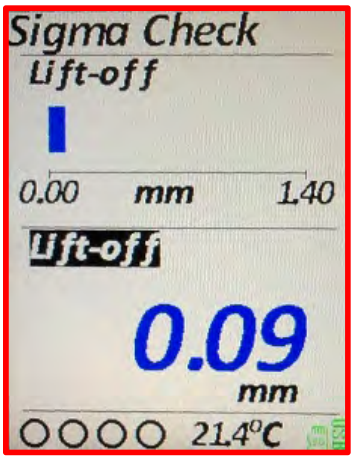
3.5 Readings Screen

Selecting the top level SIGMACHECK menu item changes the instrument into Readings Mode. Here the screen has 2 configurable panes and a status bar. Pressing the Up or Down keys toggles the selected pane, this is visible by the title of the pane being highlighted. Pressing the Left or Right keys changes the display of the selected pane through the following possibilities:

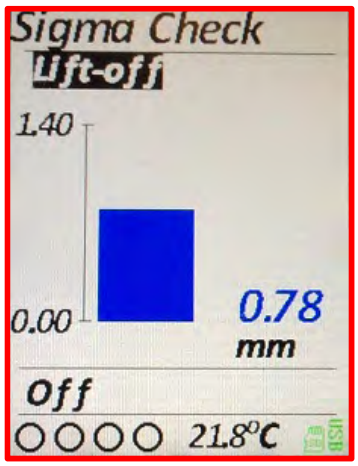
Lift Off
Conductivity
Lift Off Bar Graph
Conductivity Meter
Time & Date
Metal Sort

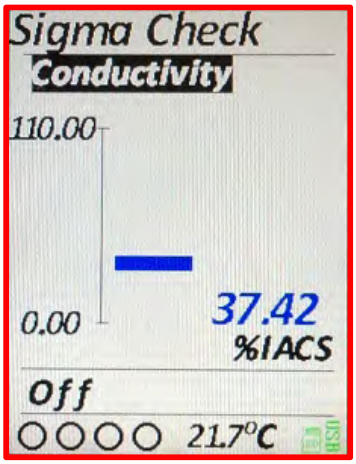
The Lower Pane can also be OFF, which expands the Upper Pane. If Data Logging is enabled then the Lower pane will ONLY show Data Logging until it is disabled. Examples of these various display modes are shown here:

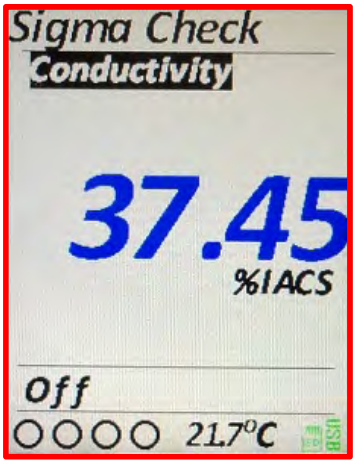




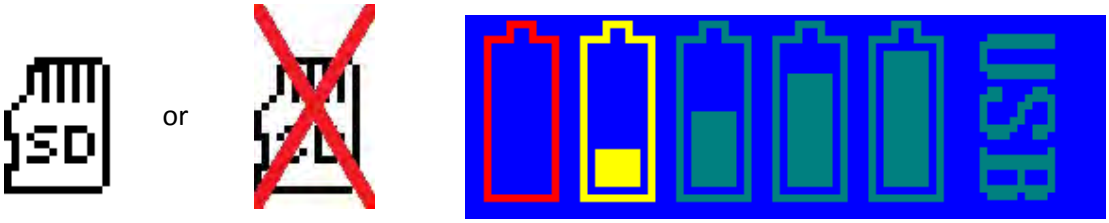
With the Lower Pane set to OFF. Examples of Lift-Off bar graph, Conductivity Meter and Conductivity:







The Status Bar shows 4 Alarm LED representations, the temperature read by the probe, a MicroSD card icon and a Battery Meter or USB indicator.
See the 3.7.4.1 ***Alarms*** section below for an explanation of their functionality. The temperature can be displayed in Celsius or Fahrenheit depending on the Units setting; see the 3.7.5.3 ***Units*** section below. The MicroSD icon will be with or without a red cross. Without a red cross indicates that the card is present and functioning correctly, with the red cross, there is a failure of the card. The battery states are Empty, 25%, 50% 75%, Full or USB Connected.



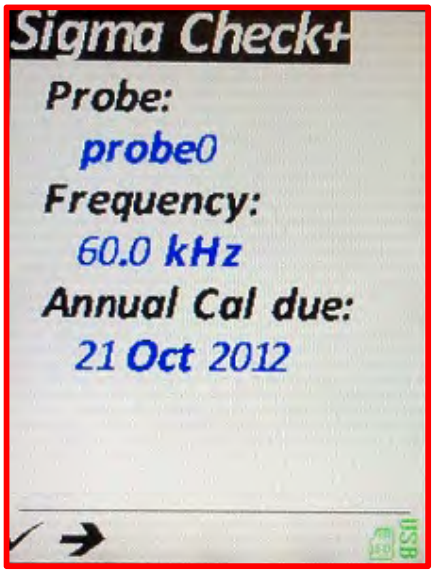
or

3.5.1 Freeze

When in Readings mode pressing the OK key will freeze the current display. Any alarms that were flashing will remain illuminated. Pressing OK again will remove the freeze and the real-time readings will continue. Pressing any other key will also cancel the freeze and the key will be actioned.
The Freeze functionality cannot be used when in Data Logging mode (as OK logs a reading) or if the instrument has not been calibrated since the last power-on (as OK moves the SIGMACHECK to the calibration menu).
Please note that the Freeze functionality freezes the display only and NOT any real time data being outputted over the USB.
To identify when the screen is frozen, the screen title text of "SIGMACHECK" will change colour.

3.6 Home / Instrument Status Screen

The Home screen shows 3 useful pieces of information, the current Probe file that is loaded in, the current Frequency that is being used and when the instrument should next be calibrated.

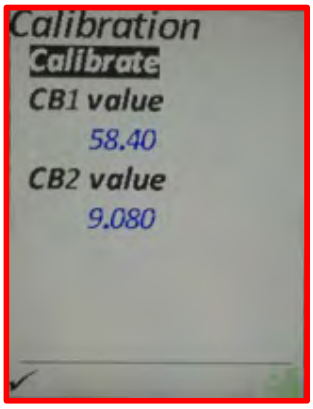


The selected Probe should be the same as what is actually connected to the instrument. If these differ then there is no guarantee that any values displayed will be accurate. If “No probe Info” is displayed, then a Probe needs to be selected from the ***probe*** menu, see 3.7.3 below.
The frequency is dependent on what is required for the inspection and what the probe has been calibrated to do during manufacture.
The Annual Cal Due date is the date by which the instrument and probe should be re-calibrated. This date will flash once it has passed. The instrument will continue to function but there is no guarantee that any values displayed will be accurate.

3.7 Setup

All aspects of the SIGMACHECK can be configured using the menus. Navigation of the menu system is explained above in 3.4 ***Menu Screen / Structure***.

3.7.1 Calibration



Calibration should be carried each time the instrument is turned on and periodically thereafter. The calibration procedure is explained below, see 6.1 ***Calibrating and making a reading***.
To calibrate the instrument, the Calibration Blocks (CB1 and CB2) values MUST be set to the values of the blocks attached to the top of the instrument. To change a value use Up or Down to highlight the desired Calibration Block. Use Left or Right to begin editing the value. Left and Right will change the currently editing character and Up and Down will cycle between 0 and 9. Moving Left from the most significant digit will add a new digit up to a maximum of 3 significant figures. Moving Right from a significant figure of 0 will remove it. When the value is correct, press the OK button to save it, or Back to cancel editing and return the value to its original value.
Selecting the menu option ***Calibrate*** will begin the calibration procedure. Press OK or Back to leave this menu.

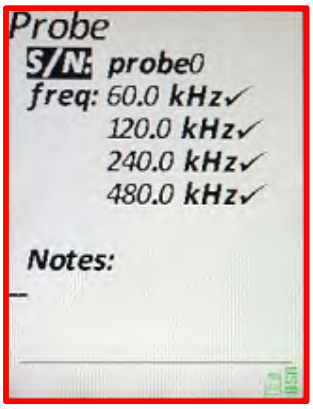
3.7.2 Frequency

On entering this menu all available frequencies for the currently loaded probe will be listed. The current frequency will be highlighted. A cross after the frequency indicates that there is a problem with the probe details at that frequency stored on the MicroSD card. A tick indicates all is well and the frequency may be selected.

Left/Up or Right/Down will move up and down the list of available frequencies. Press OK to select a frequency or Back to leave the current selected frequency.

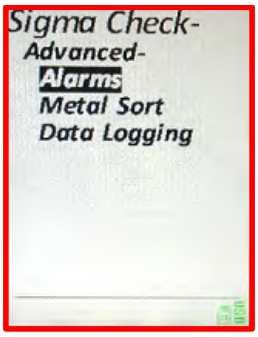
3.7.3 Probe

On entering the probe menu the current selected probe will be shown. Up and Down cycle through the headings of ***S/N*** (Serial Number), ***freq*** (frequency) and any notes that are present.



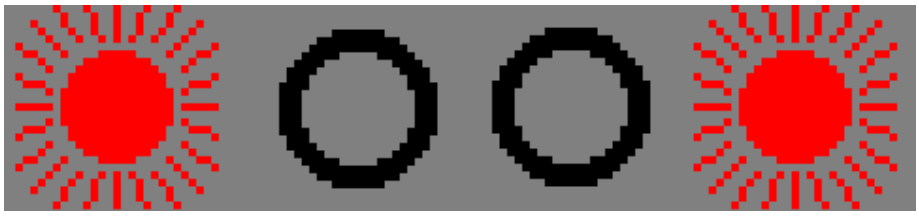
Moving Left or Right on the ***S/N*** will cycle through all available probe files on the instrument and update the rest of the screen with the details of that probe file.
Moving Left or Right on the ***freq*** heading will move up and down the available frequencies for this probe file. Pressing OK while a frequency is highlighted will load the probe file and configure the instrument to use that frequency. Pressing OK with no frequency highlighted will load in the probe file and use the first frequency in the list.
Moving Left or Right with the Notes highlighted will scroll the notes in the case that there are more characters than fit on to the screen.
Pressing Back will leave the instrument with the current probe file and at the current frequency.

3.7.4 Advanced



3.7.4.1 Alarms

A visual alarm can be configured to trigger when a Conductivity or Lift-Off exceeds or drops below a predetermined value. When an alarm is triggered and the value is visible on the readings screen the reading will flash between the Value and Alarm colours (see 3.7.5.2 ***Colour*** below). In the alarm state the corresponding LED on the status bar will flash. The LED relates to the values being shown on the Upper or Lower panes in the readings screen.



The first LED indicates that the Upper Pane value has exceeded its high alarm trigger value.

The second LED indicates that the Upper Pane value has dropped below its low alarm trigger value.
The third LED indicates that the Lower Pane value has exceeded its high alarm trigger value.
The forth LED indicates that the Upper Pane value has dropped below its low alarm trigger value.
The above diagram illustrates the Upper pane value exceeding its high alarm value while the Lower pane value has dropped below its low alarm value.

When entering the ***Alarm*** menu, four alarms are shown using the units specified in the ***Units*** menu. A High and Low value for Conductivity and Thickness is available.

To change a value use Up or Down to highlight the desired Alarm. Use Left or Right to begin editing the value. Left and Right will change the currently editing character and Up and Down will cycle between 0 and 9. Moving Left from the most significant digit will add a new digit up to a maximum of 3 significant figures. Moving Right from a significant figure of 0 will remove it.
When the value is correct, press the OK button to save it, or Back to cancel editing and return the value to its original value.
Press OK or Back to leave this menu.

3.7.4.2 Metal Sort

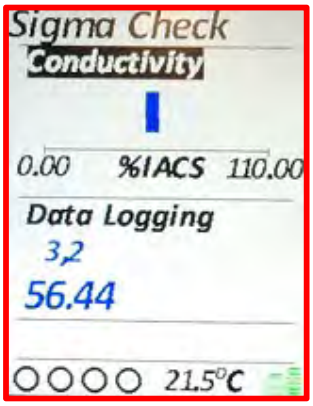
The Metal Sort functionality allows 10 different ranges of Conductivity to be entered. If conductivity is encountered that fits within one of these ranges the text associated with that range will be displayed on the Metal Sort pane.
This menu item allows the range to be entered (a low and high conductivity value) and a name that will be shown. The units of conductivity will depend on the ***Units*** menu item.

Using the Up and Down keys, the highlighted option will go from Name to Low value to High value and then to the next metal, and so on up to the 10th metal. Pressing OK will begin editing of the highlighted value or name, pressing OK again will save the new name/value whilst pressing Back will cancel editing and return the name/value to its original value. For details on editing values, see 3.7.4.1 ***Alarms*** above. Editing of characters is similar. Left and Right change the character being edited and Up and Down cycle through the available characters like so:
<space>0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz

** Please note, for a metal to be shown on the readings pane, the ***Metal Sort*** pane must be present on the Upper or Lower pane. **

When all changes have been made press OK or Back to return to the ***Advanced*** menu.

3.7.4.3 Data Logging

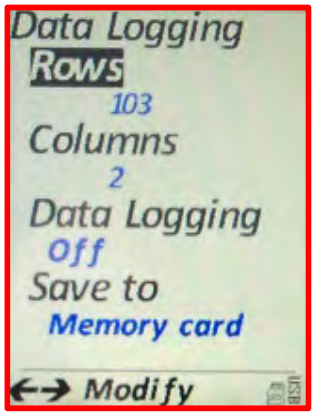


The Data Logging functionality, when enabled, allows Conductivity readings to be logged at the press of the OK button. There are 2 locations to store Data Logging data, ***Memory Card*** or ***RAM***. The differences are:

RAM
The number of readings is limited to about 8000 (Rows multiplied by Columns).
Once power is removed the readings are lost.
SigmaCheckPC can continue to operate fully.
Data Logging data can be extracted at any point using SigmaCheckPC.
Using the Left or Right keys, previous data can be overwritten.

Memory Card
While Data Logging is enabled, any card access will stop data logging.
Data cannot be uploaded until Data Logging has completed or been stopped.
Once a value has been logged, it cannot be changed.
Many separate data Logging sessions can take place and all data is saved.

These readings are stored in the SIGMACHECK's memory until they are uploaded to a PC via the USB cable and the PC Software package. The resulting file is designed to be readable by most Spread sheet packages, hence why on the Data Logging menu a number of Rows and Columns are shown. When enabled, the Data Logging pane is shown in the Lower pane of the readings screen. It shows the current Column & Row numbers and below that, the last conductivity value that was logged. When all Columns and Rows are full, the screen will show ***"Logging Full"***. If a value has been taken incorrectly the pressing Left or Right will move back or forwards between readings allowing a new reading to be taken and overwrite the existing value. When moving backwards and forwards, the previous reading at this location will not be shown.



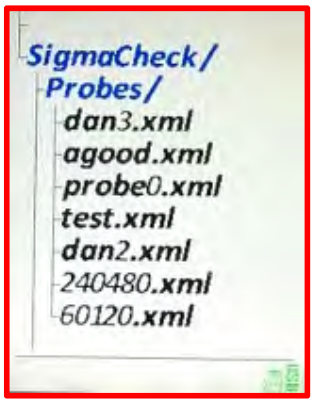
If a simple list of values is all that is required, then simply set the Rows or Columns to 1 and the other value to the required number of readings. The total number of readings taken will always be the Rows multiplied by the Columns. As each reading is taken, the SIGMACHECK increments the Column first, then when the row is full, the Row is incremented. Therefore the resulting spread sheet will have the first reading in the top left corner then reading like a book left to right, top to bottom.
For information on downloading the Data Logger data, see 5.1 ***Connecting to a PC*** below.

On the Data Logging menu, the Up and Down keys will change the highlighted heading. Left or Right keys will begin editing of the Rows/Columns or toggle the Data Logging enabled option. For editing of the values see 3.7.4.1 ***Alarms*** above.

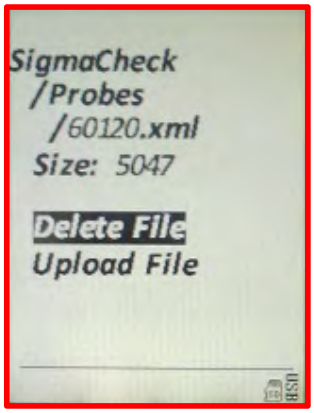
Please note, if Data Logging is enabled here, the lower pane on the readings screen will ONLY show ***Data Logging***.

3.7.4.4 Memory Card

The SIGMACHECK contains a slot for a MicroSD memory card. Correct functioning of the instrument requires a card to be fitted (the instrument is supplied with a card). The files and folder structure of the card can be seen using this menu item.
On selecting Memory the contents of the card are shown. Folders are shown with all of their contents indented. Folders are in the ***Text*** colour, files in the ***Value*** colour (see 3.7.5.2 ***Colour*** above).
If there are more files/folders than fit onto the screen (evident by the vertical line to the left going off of the bottom of the screen) then pressing the down key will scroll the view.

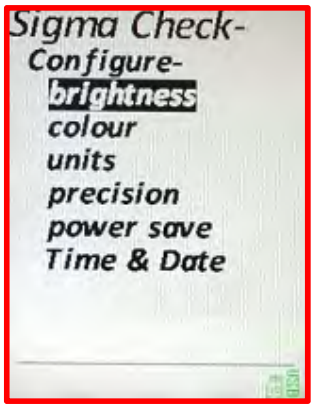


If the OK key is pressed while a file is highlighted the File Details screen is shown. It shows the file name along with its complete path. The file size (-1 if the file is in fact a directory). There is then 2 options, ***Delete*** and ***Upload***.
Delete will permantely delete the file.
Upload will send the file to SigmaCheckPC if the SIGMACHECK is connected to a PC via the USB and SigmaCheckPC is connected to the SIGMACHECK. When the file transfer is initiated a progress bar will be shown on SigmaCheckPC main screen. When complete, a Save File window will open on the PC.



Press Back to return to the ***Advanced*** menu.

3.7.5 Configure



The Configure menu contains the following sub-menus:

- Brightness
- Colour
- Units
- Precision
- Power save
- Time & date

3.7.5.1 Brightness

The brightness menu allows the brightness of the screen to be changed. Lowering the brightness will extend the battery life of the SIGMACHECK.

Pressing Left or Down will decrease the brightness by 10%
Pressing Up or Right will increase the brightness by 10%.
Pressing OK will save the current brightness level.
Pressing Back will return the brightness level back to its previous value.

3.7.5.2 Colour

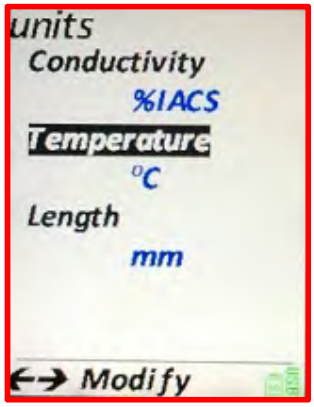
4 Colours may be changed.
The Text, Background, Value and Alarms. The text colour is the colour most often used for menu items and headings on the readings screen. The background colour is self-explanatory. The Value colour is what is used for the numbers on the readings screen and several menu items, the Alarm colour should be noticeably different to the value colour that is used to indicate that a value is in the alarm state. The colours used for the majority of the screen shots in this manual shown in the first screen shot. The others are popular alternatives.

Pressing Up or Down cycles between the headings. Pressing Left or Right cycles through the available colours which are:
BLACK, WHITE, RED, GREEN, YELLOW, BLUE, CYAN, GREY, PINK, CREAM
Pressing OK will save and use the current colour scheme. Pressing Back will go back to the previous colour scheme. It is possible to set the text and background colours to the same colour while cycling through the colours but it IS NOT possible to accept these colours to be the same.

3.7.5.3 Units

The units can be set to any of the following:

Conductivity - %IACS or MS/m
Temperature – degrees Celsius or Fahrenheit
Length (Lift-Off) – mm, Thou or mil
(Thou & mil = Thousandths of an inch).



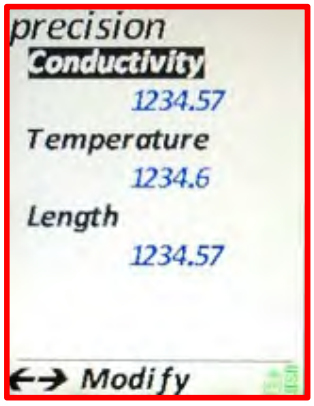
The Up and Down keys cycle between the headings, Left and Right toggle the Units for that heading.
Press OK to accept the new units or Back to return to the Configure menu and leave the units unaffected.
The units selected here affect all places where the values are displayed on the instrument, including other menus (i.e. Alarms).
The units when downloading to the PC or viewing on the SIGMACHECK PC Software is fixed to:

Conductivity - %IACS
Temperature – degrees Celsius
Length – mm

3.7.5.4 Precision

The Precision only affects how many decimal places are shown on the screen of the SIGMACHECK. The Conductivity can have 0, 1, 2, 3 or ***Auto*** decimal places.
Temperature, 0 or 1 decimal places and Length 0, 1 or 2 decimal places.
Auto changes the precision of conductivity readings depending on the value:

0 to 10 %IACS = 3 decimal places.
10 to 100 %IACS = 2 decimal places.
100 and above %IACS = 1 decimnal place.



Pressing the Up or Down keys cycles through the headings.
Pressing Left decreases the number of decimal places and pressing Right increases the number.
The number below each heading is a representation of a number displayed to the current number of decimal places.

Press OK to accept the new number of decimal places and return to the configure menu or Back to return to the menu keeping the previous number of decimal places.

3.7.5.5 Power Save

There are 2 methods of saving power. The instrument can be set to automatically dim the screen after a set time period and/or turn off the instrument completely after a set time period. These time periods range form Off (disabled) to 60minutes in 5 minute steps.

Pressing the Up or Down keys cycles between the headings.
Pressing the Left key decreases the time in steps of 5 from 60 to Off.
Pressing the Right key increases the time in steps of 5 from Off to 60.
Press OK to use the new values or Back to use the previous values.

3.7.5.6 Time & Date

The SIGMACHECK contains a real time clock. It enables the time and date to be viewed on a pane in the Readings screen and is also required for writing data to the MicroSD card. The date and time can easily be set and will be remembered even when there are no batteries or USB power.

Pressing Left or Right cycles between the fields:
Day -> Month -> Year -> Hour -> Minute -> Second.
Pressing Up or Down will increment or decrement the highlighted value, except for seconds where Up or Down will set the number of Seconds to 0.

When finished, pressing OK will set the time of the SIGMACHECK to what has been entered. Pressing Back will leave the Time & date unchanged.

3.7.5.7 Language

The majority of the text displayed by the SIGMACHECK is translated in to several different languages. On the ***language*** menu pressing the Left or Right keys cycles through the currently available languages.
Press OK to accept the new language or Back to return to the Configure menu and return the language to the previous one.

4 Charging

The SIGMACHECK may either be charged using the supplied AC charger. Alternatively using the USB cable the unit may be charged fro a standard PC USB connector. Note whilst the unit is powered up the USB charger will power the instrument but charging of the batteries will not occur until the unit is powered down.
As the instrument uses AA batteries then non rechargeable batteries may be used. These will not be charged as there is protection circuitry to prevent this.

5 Using with a PC

5.1 Connecting to PC

The SIGMACHECK connects to a PC via its mini USB-B connector. This connection provides all communications and charging functionality.
There are 2 PC applications that use this USB connection:
SigmaCheckPC and the ETherFUU (Ether Firmware Update Utility) software packages.
When a SIGMACHECK is first connected to a PC the required drivers will automatically be installed. SIGMACHECK uses Windows default drivers so no additional drivers are required.

5.1.1 SigmaCheckPC

This application has several uses when connected to a SIGMACHECK:

- Display real-time values of Conductivity, Lift-Off and Temperature
- Display the Unique ID (not the serial number) of the SIGMACHECK.
- File handling of the SIGMACHECKS microSD card.
- Upload Data Logger files from the SIGMACHECK.
- Remote control the SIGMACHECK.

Up to 4 SIGMACHECKS can be simultaneously connected, but only one can be used at a time by SigmaCheckPC. The active unit can quickly and easily be changed between any of the four by a click of one of the numbered buttons along the top of the screen.

5.1.1.1 Real-Time display

As soon as the SIGMACHECK is powered, connected to SigmaCheckPC and the instrument splash screen acknowledged, real-time values will be displayed on the SigmaCheckPC screen. Across the top of the display is the Unique ID of the instrument, followed by "Ether NDE" and "SIGMACHECK".
In larger text below that is the conductivity. In large text in the lower half of the screen is the Lift-Off.
Across the bottom is the current probe temperature.
Across the middle is a text entry box and a progress bar.
Unlike on the instrument, the units here cannot be changed and are set to:

- Conductivity - %IACS
- Temperature - degrees Celsius
- Lift off - mm

5.1.1.2 Remote Control

As soon as the SIGMACHECK is connected and the Unique ID displayed, it can be controlled from SigmaCheckPC. The 7 buttons visible on the PC Screen (Up, Down, Left, Right, OK, Power, Back), when clicked have the same effect on the instrument as pressing the physical buttons by hand. Please note that if the SIGMACHECK is being operated completely remotely then a button must be pressed after the Unique ID is shown to remove the SIGMACHECK splash Screen. Until this button is pressed no real-time data is received.

The Power button will turn the remote SIGMACHECK OFF but will not turn ON a SIGMACHECK.

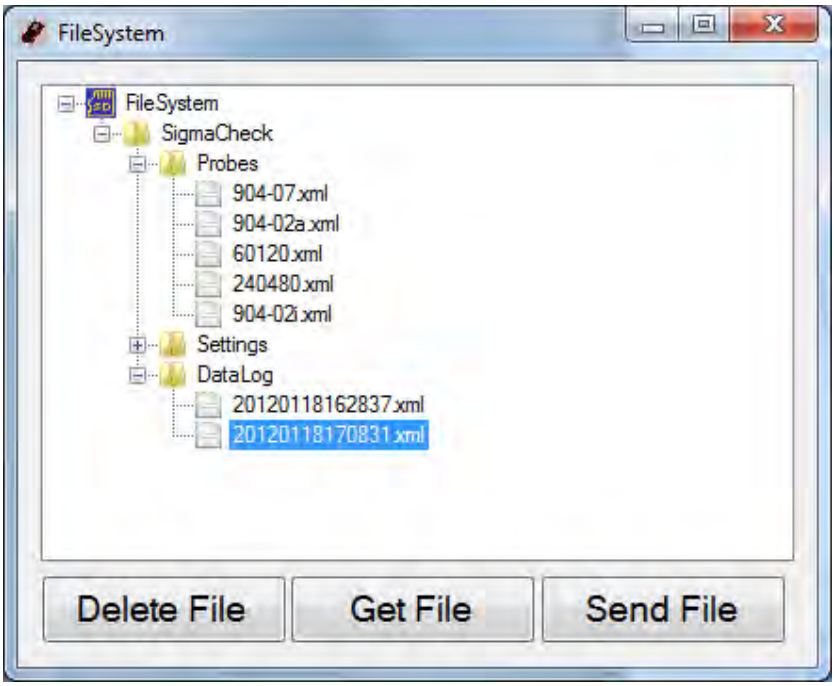
5.1.1.3 Uploading & Downloading files to/from a SIGMACHECK

There are 2 ways of getting files on and off the SIGMACHECKs MicroSD card:

1. Remove the card from the instrument (a slot is present under the Calibration Blocks), place into a PC card reader and copy the files using standard Windows / Mac capabilities.
2. Connecting the SIGMACHECK to a PC using the supplied USB cable then using the SigmaCheckPC file handling functionality via the ***MicroSD Card*** button (see below).

5.1.1.3.1 SigmaCheckPC File handling

Connect the SigmaCheck to a PC using the USB cable. With SigmaCheckPC running and connected to the instrument, click on the "***MicroSD Card***" button across the bottom. A window will appear like so:



The top of the file tree shows "File System". Everything below this is either a file or folder that is present on the SIGMACHECKS MicroSD Card. Folders that have any contents are shown with a small box to the left of their folder icon. Clicking on this box toggles it between expanded or not expanded.
If a file or directory is selected, the 3 buttons across the bottom are enabled and can be clicked. Their functionality is as follows:
Delete File – The highlighted file will be deleted. Directories cannot be deleted.
Get File – The highlighted file will be downloaded from the SIGMACHECK. A progress bar will be shown across the main screen of SigmaCheckPC to show the progress of this file download. Once complete, a Save File window will appear and the file can be saved anywhere on the PC.
Send File – An Open File window will appear and a file can be selected from the PC. Clicking ***Open*** will send this file to the directory highlighted (or if a file is highlighted, to its directory) on the SIGMACHECK. The progress bar on the SigmaCheckPC main screen will show progress of this file transfer.

After Deleting or sending a file, the screen will be refreshed showing the new state of the file system on the SIGMACHECKS MicroSD Card.

Directories cannot be created or deleted. The directory structure is used by the SIGMACHECK like so:
Probes – All probe files must reside in here.
Settings – All files related to the configuration of the instrument must reside here.
DataLog – Any files created by the Data Logging functionality (assuming it is configured to write its data to the card and not to RAM) are written here. The filename is created from the Time & Date that the file was created in the following format:

YYYYMMDDHHMMSS.xml,

ie 20120119103502 = 10:35am (and 2 seconds) on the 19th Jan, 2012.

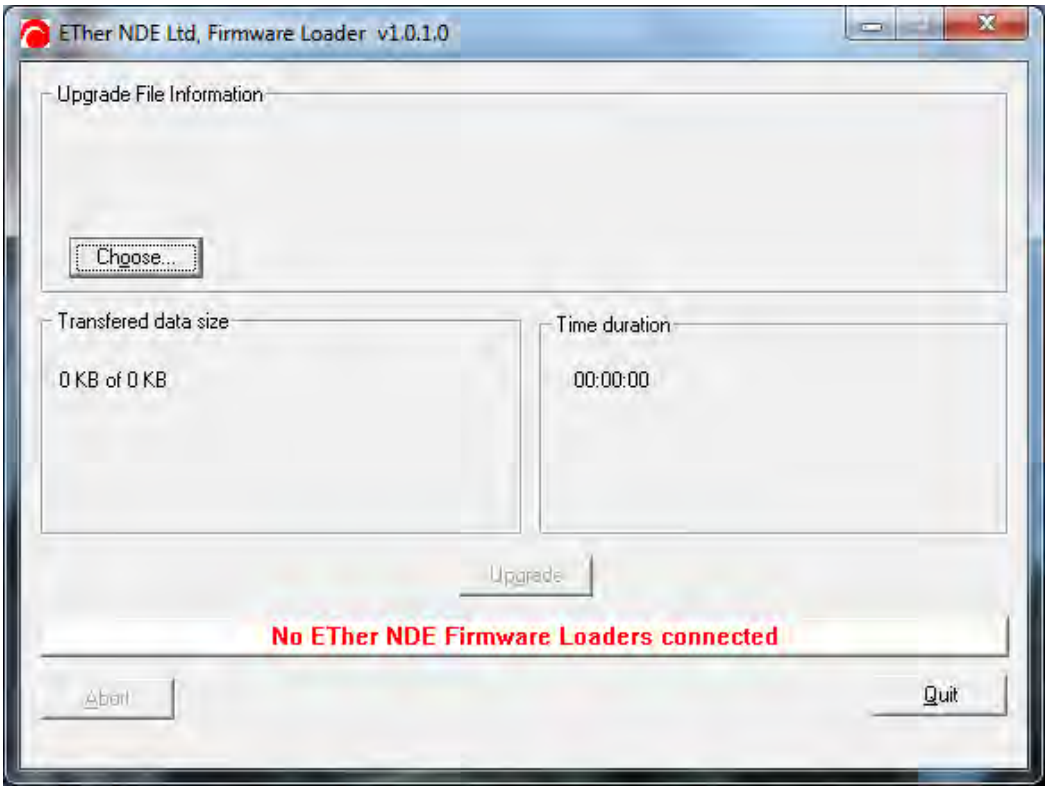
If downloading a new probe file to use, please remember that it must be selected from the ***Probes*** menu on the instrument after the download!
If any Data Logging to the MicroSd card was in progress when clicking the SigmaCheckPC button ***MicroSD Card***, it will be terminated. The data will not be lost and the file will be closed safely.

5.1.1.4 Downloading Data Logger Data from RAM.

Data Logging can be configured to either save to RAM (internal SIGMACHECK memory) or to output to the MicroSD Card.
The benefits of the two approaches are described in section 3.7.4.3.
Clicking the "Retrieve Data" button along the bottom of the SigmaCheckPC screen will begin the upload process. As long as the SIGMACHECK is connected to SigmaCheckPC this process can be initiated. Even if data Logging has not been started, data relating to the number of Columns and Rows will be uploaded. If Data Logging was not completed, the remaining readings will be in an unknown state and will not contain valid data.
After the "Retrieve Data" button is pressed, data will begin uploading. The progress bar does not function for file upload. The time the upload takes is dependent on the number of Rows and Columns that Data Logging is set too. When Upload is complete a file save window will open. Select a file name and location where to save the XML file. For viewing the file, see 5.2 ***Using a Spread sheet to analyse data*** below.

5.1.2 ETherFUU (Firmware Update Utility)

The SIGMACHECK instrument firmware can be updated by the customer in the field allowing them to take advantage of new features and improvements as they are released from *ETHER NDE*. The process is simple and requires the ETherFUU software to be installed on a PC, the Mini-B USB cable and of course the SIGMACHECK instrument.
An update file will be provided by *ETHER NDE*, this file will be a DFU file (i.e. v_1_1_0.dfu). Run the ETherFUU software. The screen will be as so:



First, the SIGMACHECK must be put in to Firmware Loader mode. To do this:

1. Turn the instrument OFF.
2. Hold down the ***Down*** key.
3. Press the ***Power*** key.
4. When the Splash Screen is visible, release the ***Down*** key.
5. The Splash Screen will show “Ether NDE, Firmware Loader”

When the SIGMACHECK is in Firmware Loader mode, ETherFUU running on the PC and the SIGMACHECK is connected to the PC, the Splash Screen will show “Usb Connected” and ETherFUU will show:

“Connected to Ether Firmware Loader, but NO file loaded.”

Now, click the ***Choose*** button on ETherFUU and use the Open file window to navigate and select the provided *.dfu file. ETherFUU will now show:

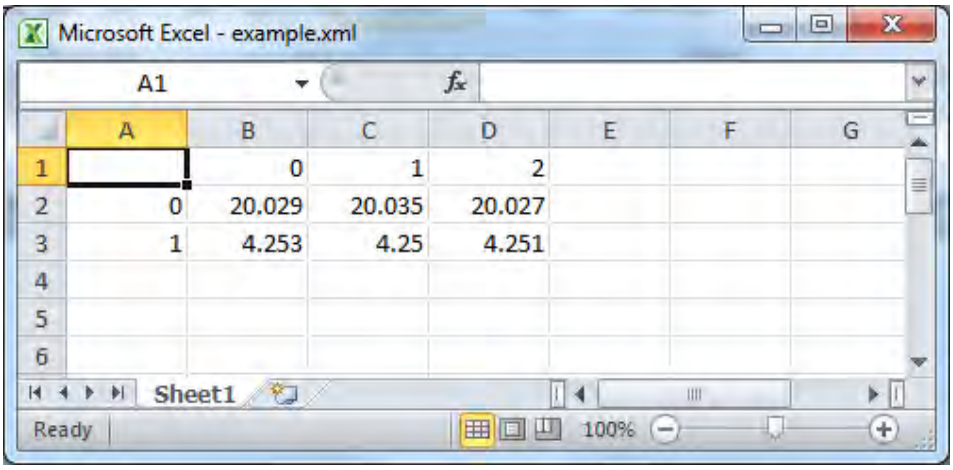
“File correctly loaded and connected”

The ***Upgrade*** button will no longer be greyed out and should be clicked. The software will be downloaded and progress will be shown by the progress bar. When completed, the SIGMACHECK must be restarted. Check on the Splash screen of the SIGMACHECK that the new software version is displayed.

5.2 Using a spread sheet to analyse data

Data Logger data that has been downloaded via SigmaCheckPC will have been saved onto the PC in a *.xml file (See 5.1.1.3 ***Uploading & Downloading files*** & 5.1.1.4 ***Downloading Data Logging Data from RAM***, above).

This file format is not automatically recognised by Windows as being a spread sheet file, so do not open the file from its icon. Open a spread sheet package, click ***Open File***, navigate to the file and open it. The spread sheet package should recognise the file format and open the file as if it was a regular Spread sheet file. Here is an example file opened up in MS Excel. The Data Logger on the SIGMACHECK was configured to have 2 rows and 3 columns:



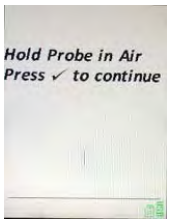
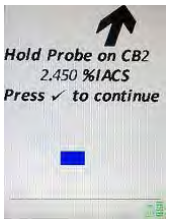
The values shown are %IACS values.

When closing the spread sheet package we recommend saving the file not in the original *.xml format, but in the Spread sheet packages default format.

6 Setting-up procedures

6.1 Calibrating and making a reading

The SIGMACHECK should be calibrated after power on and at regular intervals to ensure accuracy. What follows is a quick step-by-step guide to configuring the SIGMACHECK and taking a reading.

 Splash Screen	 Readings Screen	 Main Menu Screen	 Calibration Screen
Press Power Key for 2 seconds. Splash screen appears. After a couple of seconds the reading screen is shown.	A warnign across the bottom reads “Press ✓ to Cal” as no cal since power-on. Press OK to Cal (go to step 5) OR press BACK to go to the menu screen…	Right or Down key to access the Main Menu.	To calibrate, with ***Calibration*** highlighted, press ***OK***.
 Set air point	 Set high Conductivity	 Set Low Conductivity.	 Reading Screen
Ensure that the CB1 & CB2 values match the blocks on top of the instrument, then with ***Calibrate*** highlighted, press ***OK***.	Hold probe in air at least 100mm (4”) away from any metal or magnets. Wait for Blue bar to stabilise. Press ***OK.***	Place probe on left calibration sample wait for blue bar to stabilise and press ***OK***	Place probe on right calibration sample weight for blue bar to stabilise and press ***OK***. After a brief pause the instrument will return to the Reading Screen and is ready to use.

6.2 Using the 2d data logging function

The complete Data Logging process is broken up into several parts, each is explained in previous sections:

1. Configuring the SIGMACHECK to Data Log, see Data Logging.
2. Downloading the Data Logger data to a PC, see ***Downloading Data Logger Data***

3. Viewing the resultant files, see ***Using a spread sheet to analyse data.***

6.3 ALARM setup

The Alarm functionality is fully explained in the ***Alarms*** section.

7 Care and Maintenance

- Use soft clean cloth moistened with a soap or mild detergent to clean the case, buttons and display window.
- Do not use an abrasive cleaning agent of any kind, as this will damage the instrument.
- Do not use solvents to clean the instrument, as they will cause irreparable damage to case and contents.

8 Trouble Shooting

9 Transportation and Storage

10 Specifications

Inspection Technology	Eddy Current
Operating Frequencies	60 kHz, 120kHz, 240kHz, 480kHz, 960kHz (requires probe suitable for test frequency)
Display	240 x 320 pixels colour display. LCD with selectable backlight.
Conductivity Standards	Dual Sample Conductivity Reference Blocks mounted on top of unit. Removable for value verification, and ensuring thermal equilibrium.
Conductivity Range	0.5 % IACS to 120 % IACS, 0.28-70 MS/m
Resolution	Selectable as 1, 2 or 3 decimal places up to a maximum of 5 digits e.g. 0.050 - 120.00
Lift Off	12.7 mm probe compensated to 0.030" (0.7mm) 7 mm probe compensated to 0.015" (0.35 mm)
Absolute Accuracy	At 20 °C. +/- 0.5 % of reading plus error in reference standard. Probe in thermal equilibrium with metal.
Temperature Measurement	In-probe sensor (accurate to 0.5 °C) Range 0 °C to +50 °C
Automatic Compensation	Conductivity measurements are corrected to the 20°C value.
Environmental Range	0 to 95% relative humidity, 0°C to +50°C for reliable operation
Data Logger Memory	Removable 2GB micro SD Card allowing many thousands of probe maps to be stored and easily transferred between instruments.
Probes	12.7 mm diameter for 60 kHz - 480 kHz. Probes are interchangeable with simple operator resetting procedure. Probes are field exchangeable and do not require the return to manufacturer for calibration.
PC Connectivity	USB port for charger and PC communications
Accessories	Settings Reference Blocks - A range of conductivity references standards traceable to US and European standards are available for in-field use. Up to five can be mounted on an aluminium anodised holding plate.
Size	163mm Long x 80mm Wide x 25mm Deep
Construction & Storage	High impact, splash proof, moulded UL94-5VA flame retardant ABS case. Protective rubber boot to hold unit, probes, probe cable, operator manual on USB, and removable stand.
Weight	350g (12 oz.) including batteries
Power	Provided with 2 x 1.5 V AA Nickel Metal Hydride Batteries, Approx. up to 6 hrs. life.